

**REMARKS**

This is a full and timely response to the final Office Action mailed by the U.S. Patent and Trademark Office on June 21, 2007. Claims 1-12 and 21 are pending in the present application. Claims 13-20 are withdrawn from consideration and canceled without prejudice, waiver or disclaimer. Applicants reserve the right to pursue the subject matter of claims 13-20 in a continuation or divisional application.

Applicants respectfully submit that the amendment to claim 1 submitted in the Response dated November 22, 2006, included certain features that were apparently omitted from the listing of claim 1 in the Response dated March 19, 2007. Accordingly, the amendment language “a rare earth doped gain element optically connected in series with the loss element, the rare earth doped gain element operable to produce a signal gain in response to an optical pump; and,” and the amendment language “an optical pump source operably connected to the rare earth doped gain element, the optical pump source operable to produce the optical pump in an ON state and no optical pump in an OFF state,” is provided in the instant response so that claim 1 is accurately represented and includes the amendment that was filed on November 22, 2006.

Claim 1 is further amended. Support for the amendments to claim 1 can be found in the specification at least on page 4, lines 7-9; page 4, lines 24-29; page 5, lines 13-17 and page 7, lines 11-13, and at least in FIGs. 1 and 2. Accordingly, no new matter is added.

In view of the foregoing amendment and following remarks, reconsideration and allowance of the present application and claims are respectfully requested.

**Rejections Under 35 U.S.C. § 102**

Claims 1-9, 11-12 and 21 stand rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,690,873 to Bendett et al. (hereafter *Bendett*).

A proper rejection of a claim under 35 U.S.C. § 102 requires that a single prior art reference disclose each element of the claim. *See, e.g., W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983). Anticipation requires that each and every element of the claimed invention be disclosed in a single prior art reference. *See, e.g., In re Paulsen*, 30 F.3d 1475, 31 USPQ2d 1671 (Fed. Cir. 1994); *In re Spada*, 911 F.2d 705, 15 USPQ2d 1655 (Fed. Cir. 1990). Alternatively, anticipation requires that each and

every element of the claimed invention be embodied in a single prior art device or practice. *See, e.g., Minnesota Min. & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992). The test is the same for a process. Anticipation requires identity of the claimed process and a process of the prior art. The claimed process, including each step thereof, must have been described or embodied, either expressly or inherently, in a single reference. *See, e.g., Glaverbel S.A. v. Northlake Mkt'g & Supp., Inc.*, 45 F.3d 1550, 33 USPQ2d 1496 (Fed. Cir. 1995). Those elements must either be inherent or disclosed expressly. *See, e.g., Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 7 USPQ2d 1057 (Fed. Cir. 1988); *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 2 USPQ2d 1051 (Fed. Cir. 1987). Those elements must also be arranged as in the claim. *See, e.g., Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913 (Fed. Cir. 1989); *Carella v. Starlight Archery & Pro Line Co.*, 804 F.2d 135, 231 USPQ 644 (Fed. Cir. 1986). For anticipation, there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. *See, e.g., Scripps Clinic & Res. Found. v. Genentech, Inc.*, 927 F.2d 1565, 18 USPQ2d 1001 (Fed. Cir. 1991).

Accordingly, the single prior art reference must properly disclose, teach or suggest each element of the claimed invention.

The Office Action states that:

With regard to claims 1 and 6, Bendett discloses:

- a substrate (note summary of invention);
- a loss element having a signal loss (fig. 15A, undoped region 1312); and an Er/Yb doped gain element (gain region 1314; col. 28, line 35) optically connected in series with the loss element, the rare earth doped gain element operable to produce a signal gain (via pump light input; #1318); *in which the signal gain and the signal loss are about equal*; the loss element and rare earth doped gain element are supported on the substrate (fig. 15a, the doped and undoped regions are supported on the substrate).

The Examiner considers the claim language identified in italics above to be a functional limitation, i.e. intended use. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function alone. Since the structural limitations have been met by the prior art, the Examiner has reason to believe that the function limitation can be performed by the prior art structure by merely optimizing the pump power to produce a gain to equal the signal loss. See MPEP 2114.

With regard to claims 2-4, 7-9, and 11, col. 11, lines 20-21 disclose

doping with Er in 1.15 wt% and Yb in 4.73 wt%.

With regard to claim 5, note fig. 16A element C which is a doped cladding.

With regard to claims 12 and 21, the optical gain element is switchable between an on state and an off state merely by turning on the pump, which imparts gain to the doped region, or turning off the pump, which causes the doped region to become an attenuator, i.e. a loss element.

Applicant has amended claim 1 to recite "*an optical pump source operably connected to the rare earth doped gain element, the optical pump source operable to produce the optical pump in an ON state and no optical pump in an OFF state,*" and "*in which the loss element is configured to provide a predetermined signal loss and the rare earth doped gain element is configured to provide a predetermined signal gain, in which the absolute value of the signal gain and the absolute value of the signal loss are about equal.*"

Applicant respectfully submits that at least these features are not disclosed by *Bendett*. *Bendett* discloses, in FIG. 15A,

an amplifier optical chip 1500A with one undoped region UDR 1312 and the other region DR 1314 co-doped with Yb/Er. This allows a laser input signal to be passed through waveguide 201 (e.g., by an input fiber coupled to one endface antireflective layer 1358 (i.e., EF2), and an output fiber coupled to the other endface antireflective layer 1350 (e.g., EF1)), pump light is injected from input waveguide 1318 through WDM coupler 1316.

See *Bendett*, col. 28, lines 33-41.

Applicant respectfully submits that *Bendett* shows an *amplifier* in which a pump is applied to the undoped region 1312, and not a *switch* in which the pump is operably connected to a rare earth doped gain element, as claimed in claim 1.

Further, *Bendett* fails to disclose, teach or suggest a structure in which the "*loss element is configured to provide a predetermined signal loss and the rare earth doped gain element is configured to provide a predetermined signal gain, in which the absolute value of the signal gain and the absolute value of the signal loss are about equal.*" Applicants respectfully disagree with the statement in the Office Action that *Bendett* teaches "in which the signal gain and the signal loss are about equal." Applicants respectfully submit that Applicants' claim 1, as amended to read "in which the *loss element is configured to provide a predetermined signal loss and the rare earth doped gain element is configured to provide a predetermined signal gain, in which the absolute value of the signal gain and the absolute*

*value of the* signal loss are about equal,” indeed states a structural limitation defining the properties of the loss element and the rare earth doped gain element. This structural limitation is not disclosed, taught or suggested by *Bendett*. *Bendett* merely shows an amplifier in which an undoped region 1312 is located adjacent a doped region 1314. Applicants’ loss element and rare earth doped gain element are specifically configured to provide an absolute loss value and an absolute gain value that are about equal. There is nothing in *Bendett*, with regard to FIG. 15A or elsewhere, that teaches an absolute loss value and an absolute gain value that are about equal.

With regard to claims 2-4, 7-9 and 11, Applicants respectfully disagree with the statement in the Office Action that “col. 11, lines 20-21 disclose doping with Er in 1.15 wt% and Yb in 4.73 wt%.”

Applicants respectfully submit that claim 2 recites “in which the loss element comprises a waveguide including a core and a cladding, the cladding at least partially surrounding the core, in which the core is doped with at least one species of rare earth ion in the range of 5 to 75 wt % . ,” and claim 7 recites “in which the rare earth doped gain element comprises a waveguide including a core and a cladding, the cladding at least partially surrounding the core, in which the core is doped with at least one species of rare earth ion in the range of 5 to 75 wt % and in which the waveguide core is connected to receive optical pump power of a wavelength that stimulates the at least one species of rare earth ion.”

Column 11, lines 20-21 of *Bendett* state “[w]aveguides were fabricated in a commercially available phosphate glass. The glass was co-doped with 1.15 wt% Er<sub>2</sub>O<sub>3</sub> ( $0.99 \times 10^{20}$  ions/cm<sup>3</sup>) and 4.73 wt % Yb<sub>2</sub>O<sub>3</sub> ( $3.97 \times 10^{20}$  ions/cm<sup>3</sup>).”

Applicants respectfully submit that the doping levels claims in claims 2 and 7 are in a range (5 to 75 wt %.) that is outside of the doping concentrations disclosed by *Bendett*. Further, *Bendett*, in col. 16, lines 60-65 states “[f]or one particular device, a 4:1 ratio of Yb/Er was chosen with an Er concentration of  $1 \times 10^{20}$  ions/cm<sup>3</sup>. The total doping concentration is constrained since the glass is doped by substitution of Yb and Er for Na, and the total doping concentration cannot exceed 10 wt %.”

Indeed, *Bendett* acknowledges that the doping concentrations claimed in claims 2 and 7 *exceed* *Bendett*’s total doping concentration. Accordingly, *Bendett* does not anticipate Applicants’ claims 2-4, 7-9 and 11.

Accordingly, Applicant respectfully submits that independent claim 1 and dependent claims 2-4, 7-9 and 11 are allowable over *Bendett*. Further, Applicants respectfully submit that dependent claims 2-9, 11-12 and 21 are allowable for at least the reason that they depend directly or indirectly from allowable independent claim 1. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988) (Citations omitted).

### **Rejections Under 35 U.S.C. § 103**

Claim 10 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over *Bendett* in view of U.S. Patent Application Publication No. 2003/0097858 to Strohhofer (hereafter Strohhofer). For a claim to be properly rejected under 35 U.S.C. § 103, “[t]he PTO has the burden under section 103 to establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Applicant has amended claim 1 to recite “*an optical pump source operably connected to the rare earth doped gain element, the optical pump source operable to produce the optical pump in an ON state and no optical pump in an OFF state,*” and “*in which the loss element is configured to provide a predetermined signal loss and the rare earth doped gain element is configured to provide a predetermined signal gain, in which the absolute value of the signal gain and the absolute value of the signal loss are about equal.*”

Applicant respectfully submits that at least these features are not disclosed, taught nor suggested by the proposed combination. Accordingly, Applicant respectfully submits that independent claim 1 is allowable over the proposed combination. Further, Applicant respectfully submits that dependent claim 10 is allowable for at least the reason that it depends indirectly from allowable independent claim 1. *In re Fine, supra*.

**CONCLUSION**

Should the Examiner have any comments regarding the Applicants' response or believe that a teleconference would expedite prosecution of the pending claims, Applicants request that the Examiner telephone Applicants' undersigned attorney.

Respectfully submitted,

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